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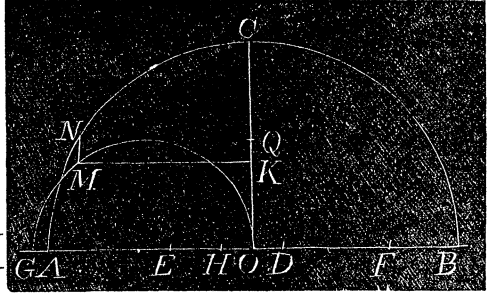
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“To CONSTRUCT a regular polygon of seventeen sides in a circle.

Draw the radius CO at right-angles to the diameter AB : On OC and OB , take OQ equal to the half, and OD equal to the eighth part of the radius: Make DE and DF each equal to DQ , and EG and FH respectively equal to EQ and FQ ; take OK a mean proportional between OH



and OQ , and through K , draw KM parallel to AB , meeting the semicircle described on OG in M ; draw MN parallel to OC , cutting the given circle in N —the arc AN is the seventeenth part of the whole circumference.”

PROBLEMS.

162. SELECTED.—Given

$$x^2 + xy + y^2 = 37, (1)$$

$$x^2 + xz + z^2 = 49, (2)$$

$$y^2 + yz + z^2 = 61, (3)$$

to find x , y and z by quadratics.

163 BY PROF. ORSON PRATT, SEN.—Resolve the first member of the general Cubic Equation, $x^3 + px^2 + qx = -r$, into three factors, such that, when their signs are changed, their sum shall equal p ; when their signs are unchanged the sum of their products, taken two and two, shall equal q ; and when their signs are unchanged, their continued product shall $= -r$. Or, in other words, find the forms of the three roots in terms of x and the coefficients.

164. BY PROF. W. W. BEMAN, ANN ARBOR, MICH.—From any two points to draw two lines which shall meet in the circumference of a given circle, and make equal angles with the tangent at the point of intersection.

165. FROM BOOLE'S DIFF. EQ'NS (by request).—Of the system of dynamical equations,

$$\frac{d^2x}{dt^2} + \frac{mx}{r^3} = 0, \quad \frac{d^2y}{dt^2} + \frac{my}{r^3} = 0, \quad \frac{d^2z}{dt^2} + \frac{mz}{r^3} = 0,$$

where $r = \sqrt{(x^2 + y^2 + z^2)}$, seven first integrals are obtained of which it is subsequently found that five only are independent. How many final integrals can hence be deduced without proceeding to another integration.

166. BY PROF. W. P. CASEY, SAN FR. CAL.—If through a point O , within a given triangle ABC , three lines be drawn respectively parallel to the sides of the triangle; viz., GE parallel to BC , FH , to AB and DT to AC , and there is given, $GO \times OE + FO \times OH + DO \times OT$; to find the locus of O by plane geometry.

167. BY PROF. C. M. WOODWARD.—A solid sphere rolls down a trough formed by two planes which make with each other an angle 2ϕ . Find an expression for the time when the inclination of the trough to the horizon is θ .

168. (SELECTED) BY PROF. H. T. EDDY.—Find the general value of

$$u = \iint \frac{dx dy}{\sqrt{(1+x^2+y^2)^3}}$$

and show that when the limits of x and y are 0 and 1, $u = 0.5 +$

169. BY PROF. JOHNSON.—Base balls are covered by sewing together two dumb-bell shaped pieces of leather. Determine the shape of the pieces so as to reduce the distortion in fitting them to the spherical surface to a minimum.

QUERY. BY DR. N. R. OLIVER.—How is the *Rule*, given at page 44, Gillespie's Land-surveying, (5th edition, New York, 1857,) demonstrated?

QUERY. BY GEORGE LILLEY, KEWANEE, ILL.—It is stated that Prof. Paolo Gorini, of Lodi, in Italy, has recently succeeded in demonstrating Peter De Fermat's famous theorem. What is the demonstration?

NOTICES OF PUBLICATIONS RECEIVED.

NOTE ON THE SENSATION OF COLORS. BY C. S. PEIRCE. This paper is a mathematical discussion of the change produced in the sensation of color by varying the intensity of the light. The paper is a contribution to the Amer. Journal of Science for April, 1877, and will be continued in the May No. of that Journal.

ON THE ATMOSPHERES OF THE SUN AND PLANETS. BY DAVID TROWBRIDGE, A. M. This is a pamphlet of seven pages, 8vo., and is an attempt to estimate the probable volume, density and height of the atmospheres that are supposed to surround those bodies. The pamphlet embodies a paper read before the Amer. Phil. Soc., Nov. 3, 1876, and published in the Proceedings for that year.

THE MATHEMATICAL VISITOR, No. 1., EDITED AND PUBLISHED BY ARTEMAS MARTIN. The *Visitor* is devoted mainly to the solution of questions, and the editor announces that it will be published annually; No. 2 will appear about the first of Jan. 1878. No. 1 is a 4to of eleven pages; price 20 cts. No. 2 will contain 32 pages and its price will be 50 cts. Address, Lock Box 11, Erie, Pa.